

Appl. No. 10/711,790
Amdt. dated August 15, 2006
Reply to Office action of May 16, 2006

Amendments to the Claims:

Listing of Claims:

Claim 1 (currently amended): A metal layer structure comprising:

- a substrate;
- 5 a first dielectric layer on a surface of the substrate;
- at least one metal structure disposed in the first dielectric layer;
- a second dielectric layer disposed on the first dielectric layer and the metal structure;
- at least one first conductor on the first dielectric layer; and
- at least one second conductor on the first dielectric layer, the second conductor
- 10 having at least one thin portion; ~~and;~~
- at least one conductive plug disposed in the second dielectric layer for connecting
- the first conductor, the second conductor and the metal structure.

- Claim 2 (original): The metal layer structure of claim 1 wherein the second conductor has
- 15 at least one thick portion.

Claim 3 (original): The metal layer structure of claim 2 wherein a thickness of the first conductor is equal to a thickness of the thick portion.

- 20 Claim 4 (original): The metal layer structure of claim 2 wherein a ratio of a thickness of the thick portion to a thickness of the thin portion is approximately 1 to 8.

- Claim 5 (original): The metal layer structure of claim 2 wherein a thickness of the thick portion is approximately 0.8 to 1.6 μ m, and a thickness of the thin portion is smaller than
- 25 0.8 μ m.

Claim 6 (currently amended): The metal layer structure of claim 1 further comprising:

- a first opening exposing the first conductor;

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a second opening exposing the thin portion; and
a ~~second~~third dielectric layer on the first dielectric layer that covers the first conductor and the second conductor.

- 5 Claim 7 (currently amended): The metal layer structure of claim 6 wherein the ~~second~~third dielectric layer is a PE-oxide layer.

Claim 8 (canceled)

- 10 Claim 9 (currently amended): The metal layer structure of claim ~~8~~1 wherein the metal structure is copper (Cu).

Claim 10 (currently amended): The metal layer structure of claim ~~8~~1 wherein the ~~third~~first dielectric layer is a low-k dielectric layer.

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Claim 11 (currently amended): The metal layer structure of claim ~~8~~1 wherein the metal structure is copper, and the ~~third~~first dielectric layer is a low-k dielectric layer.

- 20 Claim 12 (original): The metal layer structure of claim 11 wherein a dielectric constant of the low-k dielectric layer is approximately 2.0 to 3.5.

Claim 13 (original): The metal layer structure of claim 11 wherein the low-k dielectric layer comprises a carbon-contained oxide layer or an inorganic dielectric material layer.

- 25 Claim 14 (currently amended): A metal layer structure comprising:
a substrate;
a first dielectric layer on a surface of the substrate;
at least one metal structure disposed in the first dielectric layer;

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- a second dielectric layer disposed on the first dielectric layer and the metal structure;
at least one first conductor on the first dielectric layer; ~~and~~
at least one second conductor on the first dielectric layer; and
at least one conductive plug disposed in the second dielectric layer for connecting
5 the first conductor, the second conductor and the metal structure;

wherein the first conductor and the second conductor have a first thickness and a second thickness, respectively, and the first thickness and the second thickness impart different functions to the first conductor and second conductor, respectively.

- 10 Claim 15 (original): The metal layer structure of claim 14 wherein a ratio of the first thickness to the second thickness is approximately 1 to 8.

Claim 16 (original): The metal layer structure of claim 14 wherein the first thickness is approximately 0.8 to 1.6 μ m, and the second thickness is smaller than 0.8 μ m.

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- Claim 17 (currently amended): The metal layer structure of claim 14 further comprising:
a first opening exposing the first conductor;
a second opening exposing the second conductor; and
a ~~second~~third dielectric layer on the first dielectric layer that covers the first
20 conductor and the second conductor.

Claim 18 (currently amended): The metal layer structure of claim 17 wherein the ~~second~~third dielectric layer is a PE-oxide layer.

- 25 Claim 19 (canceled)

Claim 20 (currently amended): The metal layer structure of claim ~~19~~14 wherein the metal structure is copper (Cu).

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Claim 21 (currently amended): The metal layer structure of claim ~~19~~14 wherein the ~~third~~first dielectric layer is a low-k dielectric layer.

- 5 Claim 22 (currently amended): The metal layer structure of claim ~~19~~14 wherein the metal structure is copper, and the ~~third~~first dielectric layer is a low-k dielectric layer.

Claim 23 (original): The metal layer structure of claim 22 wherein a dielectric constant of the low-k dielectric layer is approximately 2.0 to 3.5.

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Claim 24 (original): The metal layer structure of claim 22 wherein the low-k dielectric layer comprises a carbon-contained oxide layer or an inorganic dielectric material layer.

Claim 25 (currently amended): A fuse structure comprising:

- 15 a substrate, a bonding pad area and a fuse area being included on a surface of the substrate;
- a first dielectric layer on the surface of the substrate;
- at least one metal structure disposed in the first dielectric layer;
- a second dielectric layer disposed on the first dielectric layer and the metal structure;
- 20 at least one first conductor on the first dielectric layer in the bonding pad area; and
- at least one second conductor on the first dielectric layer in the fuse area; and
- at least one conductive plug disposed in the second dielectric layer for connecting
- the first conductor, the second conductor and the metal structure;
- wherein the first conductor having a first thickness is used as a bonding pad, and the
- 25 second conductor having a second thickness smaller than the first thickness is used as a fuse.

Claim 26 (original): The fuse structure of claim 25 wherein a ratio of the first thickness to

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the second thickness is approximately 1 to 8.

Claim 27 (original): The fuse structure of claim 25 wherein the first thickness is approximately 0.8 to 1.6 μ m, and the second thickness is smaller than 0.8 μ m.

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Claim 28 (currently amended): The fuse structure of claim 25 further comprising:

a first opening exposing the first conductor;

a second opening exposing the second conductor; and

a ~~second~~third dielectric layer on the first dielectric layer that covers the first

10 conductor and the second conductor.

Claim 29 (currently amended): The fuse structure of claim 28 wherein the ~~second~~third dielectric layer is a PE-oxide layer.

15 Claim 30 (canceled)

Claim 31 (currently amended): The fuse structure of claim ~~30~~25 wherein the metal structure is copper (Cu).

20 Claim 32 (currently amended): The fuse structure of claim ~~30~~25 wherein the ~~third~~first dielectric layer is a low-k dielectric layer.

Claim 33 (currently amended): The fuse structure of claim ~~30~~25 wherein the metal structure is copper, and the ~~third~~first dielectric layer is a low-k dielectric layer.

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Claim 34 (original): The fuse structure of claim 33 wherein a dielectric constant of the low-k dielectric layer is approximately 2.0 to 3.5.

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Claim 35 (original): The fuse structure of claim 33 wherein the low-k dielectric layer comprises a carbon-contained oxide layer or an inorganic dielectric material layer.

Claim 36 (currently amended): A fuse structure comprising:

- 5 a substrate, a fuse area being included on a surface of the substrate;
 a first dielectric layer on the surface of the substrate;
 at least one metal structure disposed in the first dielectric layer;
 a second dielectric layer disposed on the first dielectric layer and the metal structure;
 at least one fuse on the firstsecond dielectric layer in the fuse area, the fuse having a
10 thin portion and a thick portion;
 at least one conductive plug disposed in the second dielectric layer for connecting
 the fuse and the metal structure;
 a secondthird dielectric layer on the firstsecond dielectric layer that covers the thick
 portion; and
15 a first opening in the secondthird dielectric layer exposing the thin portion.

Claim 37 (original): The fuse structure of claim 36 wherein a ratio of a thickness of the thick portion to a thickness of the thin portion is approximately 1 to 8.

- 20 Claim 38 (original): The fuse structure of claim 36 wherein a thickness of the thick portion is approximately 0.8 to 1.6 μ m, and a thickness of the thin portion is smaller than 0.8 μ m.

Claim 39 (currently amended): The fuse structure of claim 36 further comprising:

- 25 at least one bonding pad on the firstsecond dielectric layer in a bonding pad area;
 a second opening in the secondthird dielectric layer exposing the bonding pad; and
 a ~~third~~fourth dielectric layer on the ~~second~~third dielectric layer that covers the thin portion.

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Claim 40 (currently amended): The fuse structure of claim 39 wherein the ~~third~~fourth dielectric layer is a PE-oxide layer.

5 Claim 41 (canceled)

Claim 42 (currently amended): The fuse structure of claim 41~~36~~ wherein the metal structure is copper (Cu).

10 Claim 43 (currently amended): The fuse structure of claim 41~~36~~ wherein the ~~fourth~~first dielectric layer is a low-k dielectric layer.

Claim 44 (currently amended): The fuse structure of claim 41~~36~~ wherein the metal structure is copper, and the ~~fourth~~first dielectric layer is a low-k dielectric layer.

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Claim 45 (original): The fuse structure of claim 44 wherein a dielectric constant of the low-k dielectric layer is approximately 2.0 to 3.5.

20 Claim 46 (original): The fuse structure of claim 44 wherein the low-k dielectric layer comprises a carbon-contained oxide layer or an inorganic dielectric material layer.

Claim 47 (currently amended): A metal layer structure comprising:

- a substrate;
- a first dielectric layer on a surface of the substrate;
- 25 at least one metal structure disposed in the first dielectric layer;
- a second dielectric layer disposed on the first dielectric layer and the metal structure;
- at least one first conductor on the first dielectric layer; and
- at least one second conductor on the first dielectric layer; and

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at least one conductive plug disposed in the second dielectric layer for connecting the first conductor, the second conductor and the metal structure;

wherein the first conductor having a first thickness is a first material, and the second conductor having a second thickness different from the first thickness is a second
5 material.

Claim 48 (original): The metal layer structure of claim 47 wherein a ratio of the first thickness to the second thickness is approximately 1 to 8.

10 Claim 49 (original): The metal layer structure of claim 47 wherein the first thickness is approximately 0.8 to 1.6 μ m, and the second thickness is smaller than 0.8 μ m.

Claim 50 (currently amended): The metal layer structure of claim 47 further comprising:
a first opening exposing the first conductor;
15 a second opening exposing the second conductor; and
a ~~second~~third dielectric layer on the first dielectric layer that covers the first conductor and the second conductor.

Claim 51 (currently amended): The metal layer structure of claim 50 wherein the
20 ~~second~~third dielectric layer is a PE-oxide layer.

Claim 52 (canceled)

Claim 53 (currently amended): The metal layer structure of claim ~~52~~47 wherein the metal
25 structure is copper (Cu).

Claim 54 (currently amended): The metal layer structure of claim ~~52~~47 wherein the ~~third~~first dielectric layer is a low-k dielectric layer.

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Claim 55 (currently amended): The metal layer structure of claim ~~52~~47 wherein the metal structure is copper, and the ~~third~~first dielectric layer is a low-k dielectric layer.

- 5 Claim 56 (original): The metal layer structure of claim 55 wherein a dielectric constant of the low-k dielectric layer is approximately 2.0 to 3.5.

Claim 57 (original): The metal layer structure of claim 55 wherein the low-k dielectric layer comprises a carbon-contained oxide layer or an inorganic dielectric material layer.

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Claim 58 (new): The metal layer structure of claim 2 wherein the thick portion and the thin portion of the second conductor comprise same material.

- 15 Claim 59 (new): The metal layer structure of claim 14 wherein the first conductor having the first thickness and the second conductor having the second thickness comprise same material.

- 20 Claim 60 (new): The fuse structure of claim 25 wherein the first conductor having the first thickness and the second conductor having the second thickness comprise same material.

Claim 61 (new): The fuse structure of claim 36 wherein the thick portion and the thin portion of the fuse comprise same material.

- 25 Claim 62 (new): The metal layer structure of claim 47 wherein the first conductor having the first thickness and the second conductor having the second thickness comprise same material.